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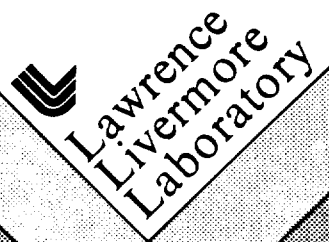
REVIEW AND FUTURE ACTIONS

by

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CONSIDER TEST PROBLEMS

	MONTE CARLO	
	EULERIAN	ZONES x ITEMS/ZONE x TIME STEPS
2D	LANGRANGIAN	100 x 100 x [~ 30 x ~ 750]
3D	HYDRODYNAMICS	(20 - 200) [500 - 1000]
	HEATFLOW	

● CURRENT METRICS

PROCESSOR

SPEEDS:

(~ 3000 $\frac{\text{ZONE CYCLES}}{\text{SEC}}$) 7600

(~ 20000 ZC/SEC) CRAY

3 - 8 MFLOPS

6 - 80 MFLOPS

30 PEAK

120 PEAK

FLOATING

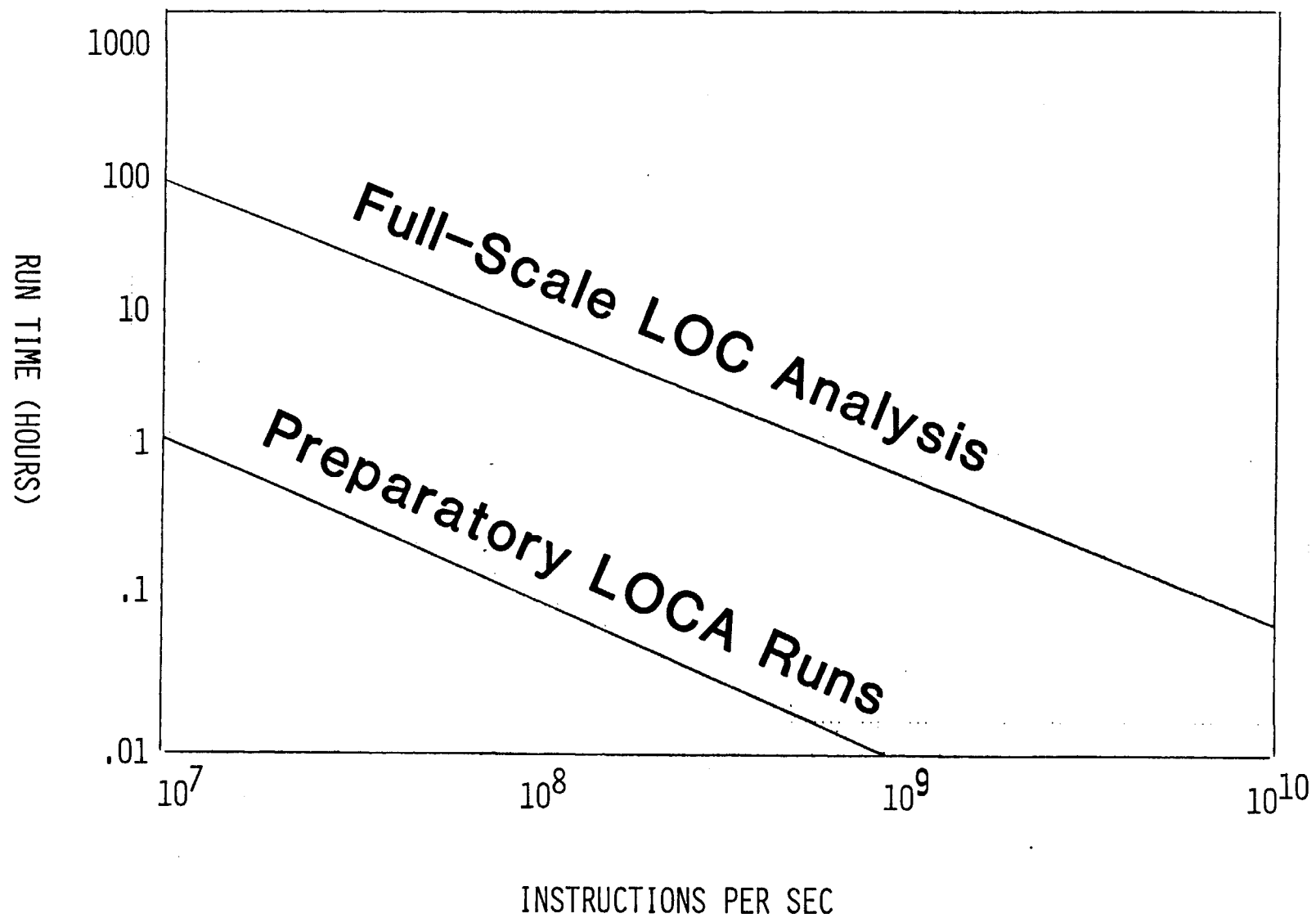
POINT

(~ 300 - 3000) PROB.

OPERATIONS

DEPENDENT

PER MASS POINT



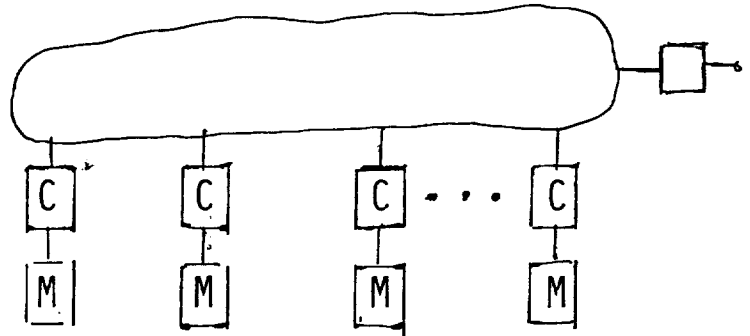
ARCHITECTURES

SEQUENTIAL (\Rightarrow IMPROVED COMPONENTS)

PIPELINE (VECTOR) : MULTIPLE PIPES

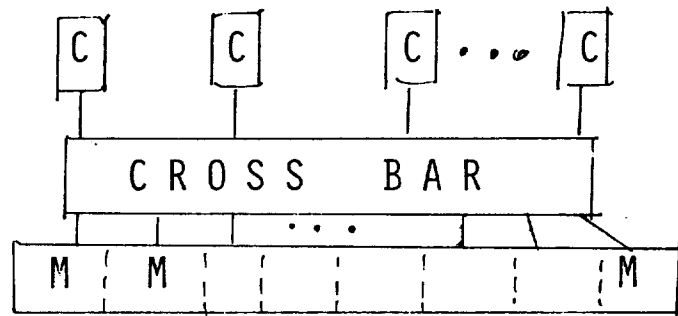
MULTIPROCESSOR

RING STRUCTURE



CROSS BAR

E.G. LLNL'S S-1



DATA FLOW

ALGORITHMS

REVAMPING OF P.D.E.'S WITH RESPECT TO:

- PARTICULAR ARCHITECTURES
- NEW ZONING TECHNIQUES
FEWER MASS PTs
MAINTENANCE OF ACCURACY
- NEW MATHEMATICAL RESULTS

BETTER OPERATING SYSTEM DESIGNS

- DISTRIBUTED
- EFFICIENT
- TIME SHARING

LANGUAGES

- FORTRAN
 - NEW PERFORMANCE ANALYSIS TOOLS
 - BETTER STRUCTURING
 - VECTOR EXTENSIONS

- NON-FORTRAN
 - PASCAL ETC.
 - ADA (PRAXIS)
 - VAL (DATA FLOW + MULTIPROCESSING)
 - ?

- SYMBOLIC MANIPULATION
 - KNOWLEDGE BASED

GOAL

THE BEST PERFORMANCE LEVEL AVAILABLE IN 1980
IMPROVED BY 1985, BY A FACTOR OF 10, AND BY
1990, IMPROVED BY A FACTOR OF 100.

THE MEANING OF OUR GOALS

10X (100X) FASTER BY 1985 (1990)

THE USER GETS RESULTS

10(100) TIMES FASTER AND/OR RUNS LARGER PROBLEMS

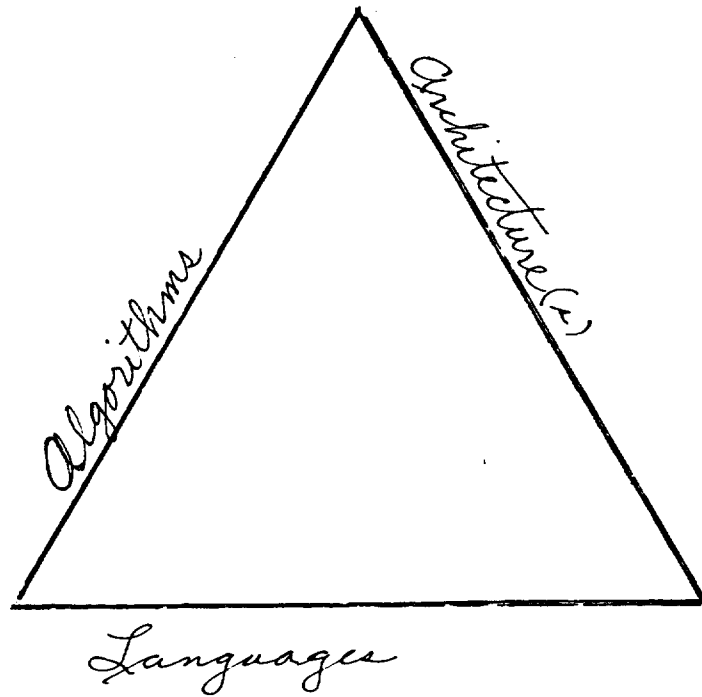
EFFECTIVENESS IS THE MEASURE

BALANCE IS NECESSARY

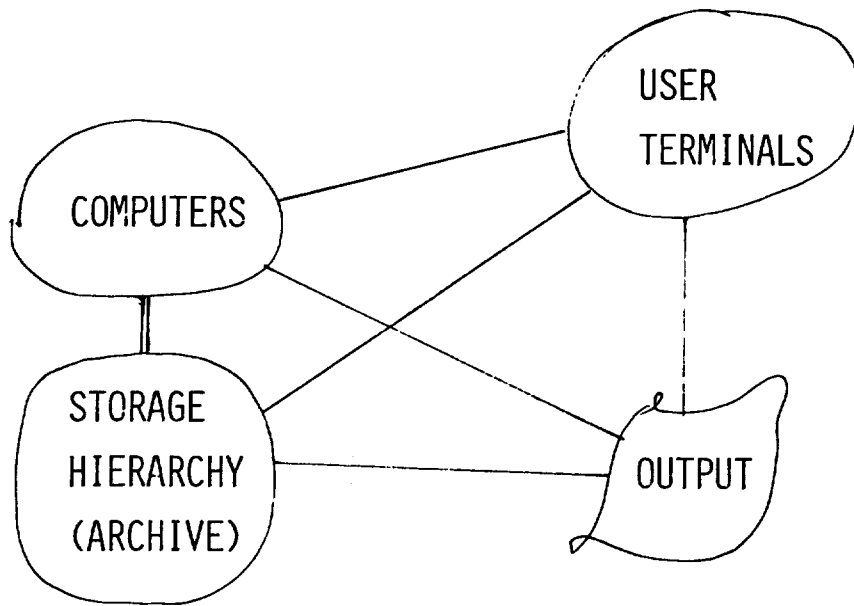
RESEARCH PATHS

AXIOMS

- IMPROVING CPU PERFORMANCE IS NECESSARY
BUT NOT SUFFICIENT
- THE COMBINED SKILLS OF ALL WILL BE
NECESSARY TO APPROACH OUR GOALS



A BALANCED SYSTEM - REQUIRED



PROCEDURE

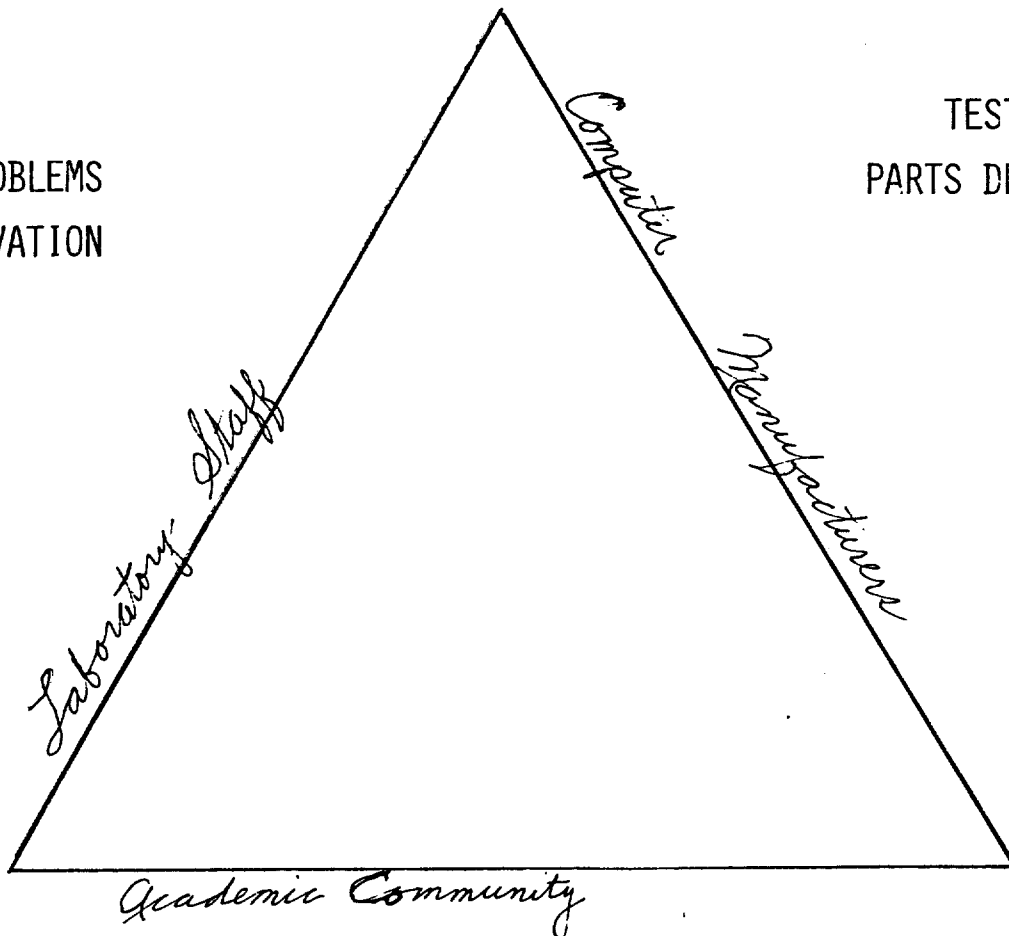
COLLABORATION

TEST

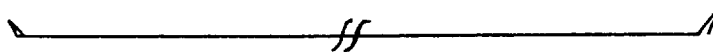
PROBLEMS
MOTIVATION

TEST BED

PARTS DEVELOPMENT



THEORY
STUDENT GROWTH



- VISITOR EXCHANGE
POST DOCTORALS
SABBATICALS
STAFFS
- CONSULTANTS

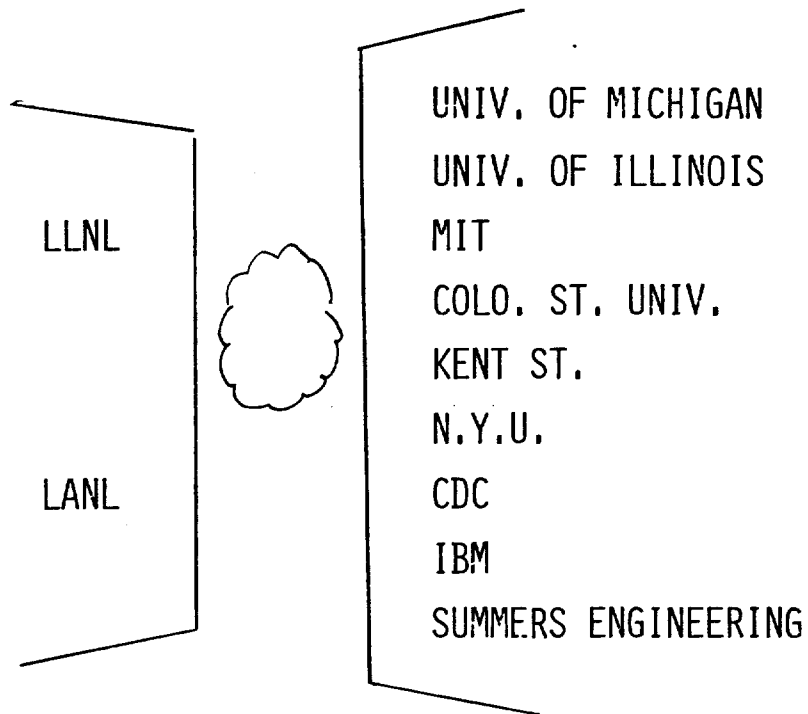
PRESENT ATTITUDE

WE THINK THE 1985 GOAL IS ACHIEVABLE.
THE 1990 GOAL IS NOT NOW CERTAIN

THE KEY ISSUE(S):

- LANGUAGES
- IMPROVING THE USER INTERFACE
 - EASE OF USE
 - MULTI PROCESSING USER'S OFFICE
(REMOVAL OF DISTRACTIONS AND FRUSTRATIONS)
 - RESPONSIVENESS

CURRENT
COLLABORATIONS



A RANDOM MENU OF TASKS YET TO BE STARTED

THE INTELLIGENT DESK

VOICE IN/OUTPUT

STORAGE ($> 10^{16}$ BITS)

DATA BASE MANAGEMENT

SECURITY

VERY LARGE MEMORY STRUCTURES

NETWORKS (LOCAL AND REMOTE)

GRAPHICS

A SPECIAL INTEREST GROUP?

ESTABLISHMENT OF AN UNCLASSIFIED
CENTER FOR LARGE CODE DEVELOPMENT

- NATIONAL NEEDS
- CHEMISTRY,
GEOPHYSICS,
ASTROPHYSICS

LANL LLNL
COLLABORATIONS

ALGORITHMIC RESEARCH

MODELING OF LARGE SCALE CALCULATIONS

COMPUTATIONAL EXPERIMENTS

LANGUAGE RESEARCH

COMMON OPERATING SYSTEM

SHARED DATA BASES

STAFF INTERCHANGE

THE NEXT MEETING(S)

COLLABORATIONS

PROVISION FOR RESPONSES BY MANUFACTURERS

DISTRIBUTION OF TEST PROBLEMS

MECHANISMS FOR MAINTAINING GROUP COMMUNICATIONS

THERE IS NO LIMIT TO WHAT
WE CAN ACCOMPLISH
PROVIDED
YOU DON'T CARE WHO GETS THE CREDIT